WHAT IS CLAIMED:

1. A method for distinguishing a differentiated lung cancer from an undifferentiated lung cancer, which method comprises detecting p63 expression in cells from a lung cancer, wherein p63 expression indicates that the lung cancer is a differentiated lung cancer and the absence of p63 expression indicates that the lung cancer is an undifferentiated lung cancer.

2. The method according to claim 1 wherein detecting p63 expression comprises detecting expression of p63 protein.

3. The method according to claim 2 wherein detecting p63 protein expression comprises detecting the p63 protein with an immunoassay.

4. The method according to claim 3 wherein the immunoassay is an immunohistochemical assay.

5. The method according to claim 1 wherein the differentiated lung cancer is selected from the group consisting of a poorly differentiated squamous cell carcinoma, a moderately differentiated squamous cell carcinoma, a well differentiated squamous cell carcinoma, an adenosquamous carcinoma, and an adenocarcinoma.

6. The method according to claim 1 wherein the differentiated lung cancer is a poorly differentiated squamous cell carcinoma.

7. The method according to claim 1 wherein the undifferentiated lung cancer is a small cell undifferentiated carcinoma.

8. A method of treatment of lung cancer in a patient, which method comprises administering a chemotherapeutic agent to a patient diagnosed with a small cell undifferentiated

3   carcinoma lung cancer, wherein the small cell undifferentiated carcinoma is distinguished from a

4   squamous cell carcinoma by detecting an absence of p63 expression in cells from the lung cancer.

1   9.   A method according to claim 8 wherein detecting p63 expression comprises

2   detecting expression of p63 protein.

1   10.   The method according to claim 9 wherein detecting p63 protein expression

2   comprises detecting the p63 protein with an immunoassay.

1   11.   The method according to claim 10 wherein the immunoassay is an

2   immunohistochemical assay.

1   12.   A method of treatment of lung cancer in a patient, which method comprises

2   surgically resecting a squamous cell carcinoma from a lung of a patient diagnosed with squamous

3   cell carcinoma lung cancer, wherein the squamous cell carcinoma is distinguished from a small cell

4   carcinoma by detecting p63 expression in cells from the lung cancer.

1   13.   A method according to claim 12 wherein detecting p63 expression comprises

2   detecting expression of p63 protein.

1   14.   The method according to claim 13 wherein detecting p63 protein expression

2   comprises detecting the p63 protein with an immunoassay.

1   15.   The method according to claim 12 wherein the immunoassay is an

2   immunohistochemical assay.

1   16.   A method for distinguishing a carcinoma of epithelial cells with squamous cell

2   potential from a non-epithelial cell carcinoma, which method comprises detecting p63 expression

3   in cells from a carcinoma, wherein p63 expression indicates that the carcinoma is a carcinomal of

4   epithelial cells with squamous cell potential and the absence of p63 expression indicates that the

5   carcinoma is a non-epithelial carcinoma or a carcinoma without squamous differentiation potential.

1   17.   The method according to claim 16, wherein the carcinoma without squamous
2   differentiation potential is a glandular carcinoma.
3

4   18.   The method according to claim 17, wherein the glandular carcinoma is a renal
5   carcinoma.
6

7   19.   The method according to claim 16, wherein the epithelial cells with squamous cell
8   potential are selected from the group consisting of squamous epithelia, transitional cells, and
9   glandular epithelia.

1   20.   A method for distinguishing a thyroid papillary carcinoma from another thyroid
2   neoplasm, nodule, or enlargement, which method comprises detecting p63 expression in cells from
3   a thyroid neoplasm, nodule, or enlargement, wherein p63 expression indicates that the neoplasm,
4   nodule, or enlargement is a papillary carcinoma and the absence of p63 expression indicates that
5   the neoplasm, nodule, or enlargement is not a papillary carcinoma.

1   21.   The method according to claim 20, wherein the neoplasm that is not a papillary
2   carcinoma is a follicular adenoma, a medullary carcinoma, an anaplastic carcinoma, or a Hurthle
3   cell carcinoma.

1   22.   A method for distinguishing a Hashimoto's thyroiditis from another thyroid
2   inflammatory condition, which method comprises detecting p63 expression in cells from a thyroid
3   inflammatory condition, wherein p63 expression indicates that the pathology is Hashimoto's
4   thyroiditis.

1   23.   The method according to claim 22, wherein the inflammatory condition is not
2   Hashimoto's thyroiditis.

1   24. The method according to claim 23, wherein the inflammatory condition is Grave's

2 disease.